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FAA Aviation NEWS

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FAA Aviation NEWS

**March/April 1989
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BRIEFS

ALOFT '89. On February 24-26 the first National Ballooning Conference was held in Leesburg, VA near Washington, DC, sponsored by the Federal Aviation Administration, National Transportation Safety Board, and the Ballooning Federation of America. Attracting balloonists from all over the world, the conference focused on safety, technology, and regulations. Experts from government and industry chaired panel discussions on current and future ballooning needs, including certification and rating of pilots, instructors, and aircraft.

OIL FUNNELS with built-in filters are one answer to the rash of incidents being reported concerning plastic debris entering the engine oil sump. Engine oil containers made of or coated or sealed with plastic or foil sheeting appear to shed material that could clog internal screens or tubing. The potential for inflight engine stoppage is serious.

U.S. CORPORATE AVIATION'S safety record in the present decade has shown a remarkable 700 percent improvement, according to the Flight Safety Foundation. In 1987 the corporate aircraft accident record was 14 accidents and 17 fatalities, compared with 96 accidents and 66 fatalities in 1980. The 1987 corporate overall rate of 0.37 accidents per 100,000 flying hours compared favorably with the scheduled air carrier rate of 0.31 per 100,000 hours. General aviation had 2,420 accidents, the lowest in several years.

BAD AIR. Pungent odors emanating from under the cockpit flooring incapacitated the crew of a Swearinger SA-226 with 10 passengers on board recently. Shortly after takeoff, unpleasant odors were noticed by the flight crew, resulting in light-headedness, body tremors, a burning sensation in the chest and reduced ability to concentrate. Supplemental oxygen did not help, as the strong odor had penetrated the oxygen masks. The aircraft was returned safely to base and the flight crew hospitalized--no one else on board had suffered any physical discomfort. Penetrating oil sprayed on control cables under the cockpit flooring proved to be the culprit, according to Transport Canada in Ontario, Ottawa.

LEGAL *but* UNSAFE?

A contradiction in terms, based on misunderstanding, according to C.R. "Tex" Melugin, FAA's Executive Director for Regulatory Standards and Compliance. Mr. Melugin is a veteran pilot with Army Air Force Experience dating back to World War II.

When an unusual rash of aircraft accidents makes headlines, our agency gets a number of questions about our safety standards. "If we have such high safety standards," people ask, "how do these accidents occur?" "Is there such a thing as legal but unsafe?"

My answer is that the standards, and the regulations that maintain them, do not prevent accidents—only people do that. There are some rules which quantify what we are talking about—in terms of pounds, knots, pressure, hours, etc. But there are other regulations which depend upon the pilot's attitude and his or her use of good judgment.

This is particularly true in general aviation, where pilots have much greater leeway as to how they may conduct a flight than is permitted in air carrier operations. The traveling public expects us to spare no effort in establishing regulatory standards that reduce the likelihood of an accident in flight to a minimum, and we do so. However, the standards for general aviation are less demanding, necessarily so, in order to make it possible for large numbers of individuals to enjoy the experience of flying.

In either case, we know that the airman's attitude—his sense of responsibility for what he is doing, and how that may affect other persons—always plays a strong role in safety of any flight.

For example, we have a rule (FAR §121.383) which does not allow pilots to fly air carriers after reaching the age of 60. Statistics tells us that this rule will reduce the possibility of inflight pilot incapacitation. However, there is no way we can regulate the behavior of a pilot who feels "somewhat under the weather" when he or she reports for flight duty. Concerned that reporting sick might result in a medical grounding, the pilot may simply decide to "tough it out."

But if an inflight crisis develops which demands peak crew performance, an ailing pilot may have difficulty handling the situation. We can only trust that the pilot who has to choose between possibly risking flight status by reporting sick, and risking the safety of the passengers on board, will make an unselfish decision.

In general aviation, we depend very heavily upon judgment in complying with the letter and intent of the rules. For example, once a pilot receives a private pilot certificate there are very few specific restrictions as to where or how he or she may operate his aircraft. He or she may legally enter into busy terminal control areas, fly over large bodies of water or rugged mountain terrain, etc., even with no previous experience in that type of flying.

However, we have in FAR §91.5 (Preflight Action) a fairly brief rule requiring that "each pilot in command shall, before beginning a flight, familiarize him/herself with all available information concerning that flight ..."

The rule does not spell out each necessary preflight action, but leaves it up to the pilot to determine which actions will be appropriate for any given flight. A private pilot has a "legal" right to enter a TCA, but if the pilot does so without previously becoming familiar with the layout of the TCA, the location of various landmarks and/or fixes; or if he/she is not capable of responding to ATC vectors or other radio instructions—then that pilot has not taken the necessary preflight actions to make the flight safely, or legally.

Similarly, for any cross country flight, the pilot is responsible for acquiring all available and necessary sources of information needed for safe navigation, terrain clearance, emergency landing, refueling, etc. But which sources are appropriate for a particular flight is something that can only be determined by the nature of the flight.

Whenever there is an aircraft accident, the tendency is to look for an immediate external cause—contaminated fuel, bad weather, a malfunctioning engine, etc. However, when we look further we generally find various actions—or non-actions—on the part of the pilot which suggest non-compliance with the implied requirements of very basic FAR §91.5. This may include failure to sample the fuel adequately, absence of an appropriate weather briefing, an inattentive engine run-up, etc.

In most accidents, we find that the safety standards are fully adequate—but the pilot's sense of responsibility for adhering to the standards has not been adequate.

In general aviation we have a very brief rule about careless or reckless flying. FAR §91.9 says simply, "No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another."

This rule sounds so simple and straight-forward that many pilots imagine it would never apply to them, since they are not inclined to indulge in low altitude buzzing, flying under bridges or anything else that is flagrantly dangerous.

But what about the pilot who takes off for a cross country flight and does not bother to check the NAV radio before leaving the area? Or who does not bother to use current charts? Or who does not obtain NOTAMs for military use of low altitude routes he may be traversing?

Any negligence of this kind which contributes to an accident may easily constitute a careless or reckless action. Even if no accident or incident occurs, you would still be operating in a careless and unsafe manner. The essence of flight safety is attending to *all* of the multitude of details that make up your "airworthiness quotient." Often enough you can get away with just "letting some things go," but make no mistake about it: you are operating in a careless or reckless manner, and sooner or later that habit will cause harm to yourself and/or others.

In my opinion the path to greater safety in flight does not lead to greater regulation, or more stringent enforcement, but to more responsiveness on the part of all airmen.

Flying through the air hundreds or thousands of feet above the ground is not exactly a "natural" activity for human beings. Safety in human flight has been made possible for us only as a result of an accumulated body of experimentation, research and experience, which culminates in our regulations. Rather than viewing these rules as a kind of burdensome obstacle course which has to be negotiated every time you fly, try looking at it as your personal safety net, without which you might soon become a victim of gravity. Instead of looking for ways to get around it, see if you can enhance it by being very attentive to everything you see, feel, hear or otherwise sense about your aircraft.

For example: *Is your hourly oil or fuel consumption creeping up? Is your mag drop edging close to an unacceptable figure? Are you having to extend your takeoff roll somewhat?* None of these occurrences, as such, would render your aircraft unairworthy, but they might be a good reason for getting your annual inspection performed a little early this year. Of course, if you simply continue to fly and experience an engine failure in flight, you can take some comfort in knowing you were operating within your legal rights. But that won't comfort you very much if you break a few bones, because you ignored some hints the aircraft was giving you.

Yes, there is such a thing as "Legal But Unsafe," but it is largely pilot preventable. ■

MAKING YOURSELF KNOWN

Self-announcing procedures at uncontrolled airports reviewed

Contrary to popular belief, the airport frequency listed on a sectional chart at uncontrolled airports is not necessarily the Common Traffic Advisory Frequency (CTAF). It is the UNICOM frequency, which may or may not be the CTAF. *Confused?* You are not alone—there are other pilots out there who do not realize where to find the CTAF or what it is for that matter.

The CTAF was designed to act as a party line for all pilots to receive and give traffic advisory information while using an airport without a control tower or FSS, or where the FAA facility is not operating. By being on the same frequency everyone would have knowledge of what others in the pattern were doing—theoretically that is.

In actual fact, you hear stories of pilots operating at an uncontrolled airport on the same runway while using different frequencies or some not using the radio at all. The UNICOM frequency is normally shown on the sectional chart (following runway information), but the CTAF may be a MULTICOM, FSS, tower or UNICOM frequency.

The current CTAF frequency can be found in the *Airport/Facility Directory, Instrument Approach Procedure Charts, Alaska Supplement, Standard Instrument Departure (SID) Charts, Alaska Terminal Publication,* or may be obtained by contacting any FSS. The CTAF should be used to monitor announcements by other pilots active in the area, and to self announce approach or departure position and intentions. Continuous monitoring communicating should be done throughout an area 10 miles distant from the movement area for both inbound and outbound traffic. Weather and other information may be provided, on request, from a UNICOM but such information is voluntary and has no official status.

Anyone wishing more detailed information may read the *Airman's Information Manual* or order the newly updated Advisory Circular 90-42E, "Traffic Advisory Practices at Airports Without Operating Control Towers." Both contain practices and procedures for using the CTAF and a list of designated UNICOM/MULTICOM frequencies. The AC contains some major changes, including a revision of UNICOM/MULTICOM frequency assignments, which are listed below:

Frequency	Use
122.700	Airports without an operating control tower
122.725	Airports without an operating control tower
122.750	Private fixed wing aircraft air-to-air communications
122.800	Airports without an operating control tower
123.000	Airports without an operating control tower (appears incorrectly as 122.000 in AC)
122.975	Airports without an operating control tower, (previously high altitude)
122.900	(MULTICOM FREQUENCY) Airports with no tower, FSS, or UNICOM. Use in Search & Rescue
122.950	Airports with control tower or FSS on airport
123.050	Airports without an operating control tower (previously heliport)
123.075	Airports without an operating control tower (previously heliport)
122.925	Airports without an operating control tower

The common traffic advisory frequency is a simple, convenient way to enhance safety at airports. To avoid confusion, always state the name of the airport you plan to use before identifying yourself and your intentions. Remember, for those who do not have radio capability, it is still the pilot's responsibility to obtain all available current information about conditions in the airport area and to visually be aware of surrounding traffic during the flight. ■

SUMMARY OF RECOMMENDED COMMUNICATION PROCEDURES

FACILITY AT AIRPORT	FREQUENCY USE	COMMUNICATION/BROADCAST PROCEDURES		
		OUTBOUND	INBOUND	PRACTICE INSTR APCH
UNICOM (No Tower or FSS)	Communicate with UNICOM station on published CTAF frequency (122.7, 122.8, 122.725, 122.975, or 123.0). If unable to contact UNICOM station, use self-announce procedures on CTAF.	Before taxiing and before taxiing on the runway for departure.	10 miles out, and entering downwind, base, and final, and leaving the runway.	Departing final approach fix (name) inbound, and approach completed/ terminated.
No Tower, FSS, or UNICOM	Self-announce on MULTICOM frequency 122.9			
No Tower In Operation, FSS Open	Communicate with FSS on CTAF. (Airport Advisory Service frequency 123.6)			
FSS Closed (No Tower)	Self-announce on CTAF.*			
Tower or, FSS not in Operation	Self-announce on CTAF.*			

*If there is a UNICOM station in operation on the airport, obtain wind and runway information from UNICOM. Return to and monitor CTAF and make self-announce broadcasts as appropriate. The wind direction and runway information may not be available on UNICOM frequency 122.950.

ADDITIONAL INFORMATION

Advisory Circular 90-42E, *Traffic Advisory Practices at Uncontrolled Airports.* Free from DOT, Utilization and Storage Section, M-443.2, Washington, DC 20590.

Airport/Facility Directory. $14 per year for one volume covering one section of the country, $10 for each additional sectional volume. Updated every 56 days. NOAA Distribution Branch, N/CG33, National Ocean Service, Riverdale, MD 20737. Telephone number (301) 436-6990.

Airman Survival in the Big Snow

If you asked 10 pilots which time of year they would least like to be stranded in remote country after an emergency landing, probably almost all of them would say winter. It is bad enough to be down and lost, but if you add to this picture the prospect of ice, snow, bone-chilling winds, etc., you can easily imagine an inevitable sense of despair and resignation. Accustomed as we are to controlling our environment at the touch of a button or switch, most of us regard wintry landscapes as hostile to human life. Okay to visit for occasional skiing, sleighing or other organized sports, but no place to survive a crash, especially with injuries. This sense of alienation from cold, apparently lifeless, objects has been responsible for much unnecessary loss of life and suffering among persons who survive the initial impact of an airplane crash in near or sub-freezing conditions.

In point of fact, almost all components of a frosty, wintry scene have some potential for shelter. For example, snow is cold to touch, but it has excellent insulation properties when properly used. Ice is not very nice to sit on, but it has good tensile strength for structural support. Dead leaves or pine needles are not as soft as a down coverlet, but do a fine job of preventing your body heat from being absorbed by frozen earth. The earth itself, even when frozen, may offer protection against howling winds in the form of burrows or caves. In short, these aspects of our environment are not essentially antagonistic, but they appear so when our fear of the cold interferes with our ability to think, to adapt—and survive.

There is no question but that airmen who are habitually prepared for emergency survival—who regularly file flight plans, keep minimal supplies on board, dress for the outdoors and take survival courses—have a better chance of coming away from a remote crash in good shape than those who do not. Nevertheless, a response to an *actual* emergency, as compared with simulated circumstances, builds up far greater stress and makes many more demands on an individual's ability to tolerate discomfort or pain or fear and still function well. The human brain is a marvelous instrument, but in the presence of continued anxiety or depression it can become a pretty dull tool.

Supposing, for example, a pilot is forced down on a wintry plateau in a snowstorm, makes a decent landing and emerges unscathed. He has on board the latest style of mountaineering tent, a good ground pad and wool blanket, waterproof matches, axe, gun, dried food, water, flares, etc.—and, of course, he is wearing thermal underwear and insulated boots. He checks out the antenna of his ELT, which looks in good shape, and then sets about pitching his tent. Strong winds make this a problem for one person; the ground is frozen and the fresh snow is too wet to hold his stakes. The tent blows away from him several times, finally gets caught in some brush and rips. He tries to mend the rip in his new tent, but by this time his fingers are too cold.

So he decides to build a fire. Brush and trees are scanty, so he takes his axe and tramps off in the snow to find suitable firewood. By the time he has cut down a tree and hacked it up into lengths he can carry, it is dusk and in the still-heavy snowfall he can no longer see the airplane. He abandons his wood and axe and races frantically around in the snow searching, but finds nothing. Eventually, exhausted, totally frustrated and damp with perspiration that is beginning to freeze, he slumps down and begins to go numb. Somewhere nearby, hidden by snow and darkness, the cabin of the airplane contains warm blankets, food, everything he needed to survive the night.

An airplane crash, like a car crash, is a frightening, often traumatic experience under any circumstances, even when injuries are not serious. In responding to the emergency situation that follows, it is important to establish the priorities quickly, especially in a cold climate. Daylight is short in winter, the temperature drops sharply with the sunset, and you may have only a few hours, or even a few minutes, to establish your lodging for the night (a very different situation from the whole day you may have had in a practice session). An effective response can never be cut and dried; it must always be tailored to the realities of your present situation.

Consider, by way of contrast, an accident which happened in November in Bristol Bay, Alaska. The pilot of a *Taylorcraft* decided to visit a small island in the bay, about 50 miles southwest of Anchorage, to do a little beachcombing. He landed on the beach without incident, but as he was taxiing toward a cove the wind, which was gusting more strongly than he realized, picked up his onshore wingtip and flipped the light plane into the bay. By the time the startled pilot emerged from the cockpit, clutching what few items of survival gear he could lay hands on, he was already 50 feet from shore and the aircraft was sinking. Struggling out of the 40° F water he lost all of his possessions except the knife in his pocket.

Once ashore he attempted to start a fire with sparks from the knife blade struck against stones, but was unsuccessful. Then he managed to find a small cave on the beach which sheltered him from the wind. He was wearing wool knit underwear and a fiber parka which shed water well; most of his discomfort came from his soaked blue jeans and the water in his shoepads, which he removed. He spent a shivery (20° F) night in the cave, protected from the sub-zero windchill on the beach, and in the morning a C–130 spotted the SOS he had traced in the sand and sent help.

Clothing has been defined as "shelter close to the body." Clothing's effectiveness against cold is measured by its ability to trap the body's radiated heat with dead air spaces and by its ability to repel moisture. (Wet clothing extracts body heat nearly 200 times faster than dry clothing.)

Wool is unique among clothing materials in its ability to maintain body heat fairly well even after being immersed. This is because wool fibers trap air in tiny pockets, preventing complete saturation. In contrast, cotton saturates readily. Cotton also "wicks" water rapidly from wet to dry areas, and damp conducts heat away from the body almost as fast as water itself.

One disadvantage of wool is its relatively loose weave, which provides inadequate protection against strong winds. A lightweight outer garment of some synthetic material, such as nylon, solves this problem. Ideally it is best not to depend upon a single massive garment, which could become soaked with rain or from perspiration; easily removable layers of clothing work well.

In freezing temperatures, immersion in water causes a drain on your body heat that may be life-threatening. You may be able to blot out some of the water by rolling around in dry snow. If you can remove the soaked garments and shelter yourself otherwise, hang out the wet clothes to freeze and then beat the ice crystals out of them.

As regards *structural* shelters, you have essentially three options:

1) you can use the fuselage interior,
2) you can modify the fuselage with external add-ons, or
3) you can seek other shelter in the environment.

If you are injured seriously you do not want to move around unnecessarily, so staying put—once the threat of fire is past—is normally your best bet.

As an overnight home in the snow, an aircraft interior can be deceptively snug—at first. You may find it fairly comfortable as is, in the daytime, but if you make no preparations for the night you could be in serious trouble. Metal, especially aluminum, conducts heat very rapidly. Unless you take pains, while it is still light enough to see, to insulate the metal walls and close off any openings, nightfall will see a tremendous exodus of heat.

During the best part of 24 hours the only source of heat in that aircraft may be your body, and you do not want to overtax it. Use newspaper, charts, carton, fabric, etc., as insulators, and curtain off all of the interior space that you do not actually take up—thereby reducing the drain on your body "heater." Stuff all cracks and crevices with any suitable material you can find, sealing yourself in as tightly as possible. Anticipate that the outside air temperature will fall steadily through the night, and your ability to function may deteriorate also. Do not be bashful about huddling closely with any other warm body (bodies) in the cabin; the less body surface exposed to the air, the less heat loss.

Even if the fuselage is badly broken up, you may not wish to abandon it—particularly if you are injured, or the snow is deep, or the weather is stormy. Any upright sections of the aircraft can be useful, as a windbreak and/or a support for other adjoining walls you may be able to fashion out of snow blocks, stones, pieces of cowling or fabric, or carpeting, or tree limbs. Having one sturdy wall to begin with will cut down your construction time and allow you to give more attention to devising ingenious means of insulating. Any flooring of snow or damp, cold earth will need some nonconductive padding. Ransack the unused portion of the airplane for such items as seat stuffing, carpeting, sunvisors, plastic interior side panels, floorboards—virtually anything nonmetallic.

If the plane is destroyed by fire, or the terrain is conducive to shelter construction, you may choose the third option. The guiding principle is to use the best materials that are close at hand, and build no larger than the actual space needed to enclose the persons to be protected.

For example, if there is firm snow, you can make a quick shelter out of snow blocks, but do not design something for the cover of "Homes Beautiful." An igloo, which takes many bodies to heat, could be days in the building; a simple trench in the snow with snow blocks arched over for a ceiling could be built in an hour or two and serve your purpose fine. The point is to survive, not to entertain, or set up long range housekeeping. (With ELT tracking, about 98% of the emergency signals are responded to within 72 hours.) The floor should be covered with dead foliage or grass or tree bark, at least four inches (it will compact under your weight). Enclosing the insulation in plastic garbage bags will keep it from hollowing out. Plastic may also be used for windows, to let in sun warmth and allow you to watch for rescue planes. Seal the entrance well, and your body warmth will glaze over the ceiling, which will refreeze, forming rigid ice girders.

If there are trees nearby you can use deadwood for roofing or walls, in combination with plastic, metal panels, propeller blades, and anything else you can salvage. If you use large garbage bags for the ceiling, just be sure the framework will support any unexpected accumulation of snowfall or rain.

Building a fire for warmth and signalling is important, but in cold weather this is almost always secondary to obtaining a shelter. The colder the weather, the less likely you could survive a night without protection from wind and precipitation. The more forethought you give to bringing outdoor clothing and survival gear with you, the less you will suffer; but once down you are past that. Focus your mind on using what the environment offers, and you may be pleasantly surprised to find what countless other living creatures have known for centuries: you can make a home in the snow. ■

The Best Weather Presentation in the World

What is the first thing that sailors, farmers, truckers and pilots think about when they get up in the morning? Right—the weather! For these people the success and safety of the day's planned activities will depend on the atmospheric conditions in their vicinity or along their intended route of travel. Fortunately a quick look at what lies in store for the entire nation, weatherwise, can be found no farther away than their television set and the "A.M. Weather" program.

"A.M. Weather" is a 15-minute graphic, in-depth TV presentation of the weather scene across the entire nation, aired each weekday morning over a network of public service stations in nearly every state of the Union. The program begins with a live report at 6:45 a.m. E.S.T. and is repeatedly updated by video tape, with forecasts that are valid until noon.

The broadcasts are carried by 285 public service stations and are frequently taped for display in pilot lounges at airport FBO's. The weather information includes satellite motion sequences, radar summaries, and 12, 24, 48 and 72 hour forecasts for all areas of the country.

To create what many consider "The finest weather broadcast in the world," the "A.M." team assembles in a production trailer at Owings Mills, MD (a small community just north of Washington, D.C.) at 3:00 a.m. every morning. On hand will be three "Mets," or expert meteorologists from the National Oceanic and Atmospheric Administration; three graphic artists who specialize in constructing video maps; a production staff from Maryland Public Television; and a camera crew from the station—usually about 10 to 12 persons in all.

The work "day" begins with the gathering up of raw data from computer and teletype printers into composite maps, tagged with symbols for every imaginable form of weather phenomenon, including rain, snow, hail, fog, smoke, dust, temperature, dewpoint, icing levels, storm systems and fronts, pressure readings, etc. A virtual flood of verbal and digital information has to be analyzed and reconfigured into a format that includes live speakers, onstage displays and pre-taped segments within the allotted 15 minute broadcast.

Shortly after 6:00 a.m. a dress rehearsal takes place. This is the time to work out how all the material is to flow together smoothly, and to winnow the presentation down to 15 minutes.

At 6:45 the live show goes on the air, opening always with a beautifully animated and musically orchestrated sunrise scene. This is quickly followed by photographic motion sequences from satellites. Next the nationwide weather picture is shown in detail with commentary and analysis from the "Mets." Although the show is intended to serve persons with a variety of interests in the weather, special attention is given to details concerning flight safety, such as the probability and severity of inflight icing.

At 7:00 a.m. the team takes a "lunch" break, but a very short one because more current weather information is continuing to spew out of the data link receivers. This material needs to be worked into an updated version of the early show; three or four complete taped updates are sent out in the course of the morning. The day's production is usually over by 11:00 a.m., when every one goes home to rest, recuperate and get ready for tomorrow. The show goes on every weekday morning 52 weeks a year—except for Christmas day.

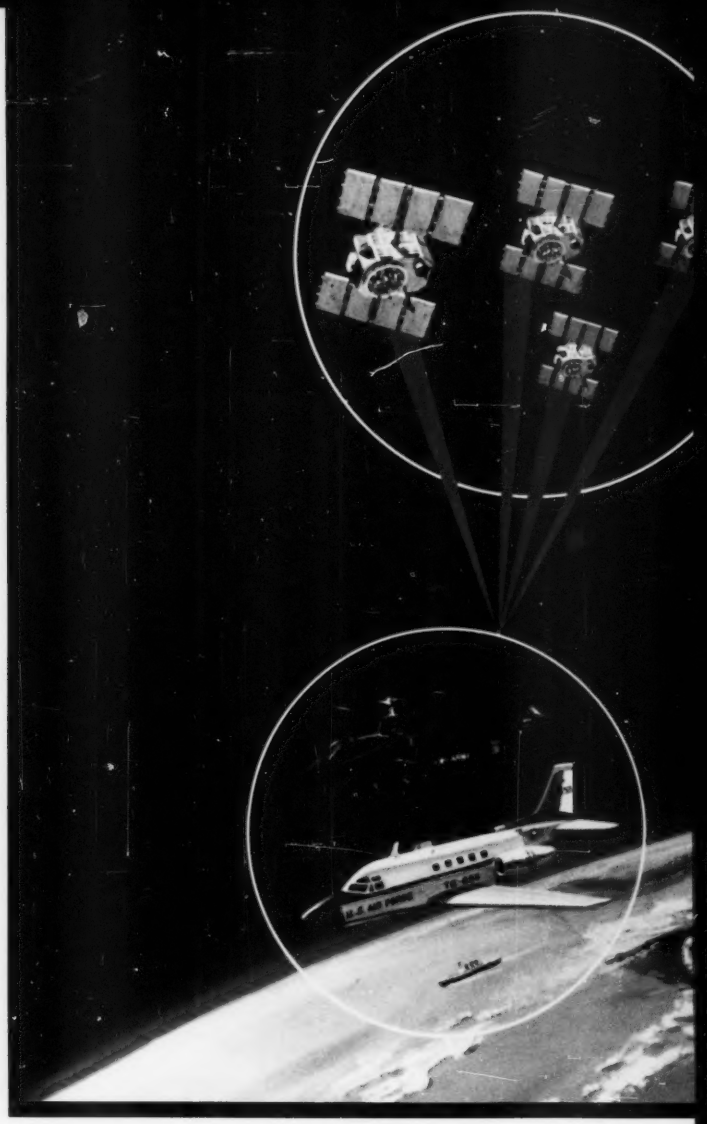
"A.M. Weather" is a lot of work by a lot of highly trained and dedicated persons, who enjoy their job because they feel it is appreciated. Many pilots have commented that watching the program makes them far more capable of understanding the official weather briefings they get before taking off—or deciding not to go. The program has been given many awards for excellence in broadcasting, including FAA's Award for Distinguished Service, for "providing the nation's aviation community with weather information designed to offer pilots the safest flight possible."

Further recognition has come in the form of monetary grants from the FAA, and from the aviation organizations and business corporations. As a result, the entire production is financially self-supporting—which means, hopefully, that early rising weather watchers can count on continuing to see a bright sunrise—at least electronically.

A list of local broadcasting stations and show times for "A.M. Weather," along with a key to all the weather symbols in general use, is available free from: A.M. Weather, MD Public TV, 11767 Bonita Avenue, Owings Mills, MD 21117. Telephone (301) 356-5600. ■

LIGHTHOUSES IN THE SKY

Navigation prepares to enter the Space age



After more than a decade of development and testing the Department of Defense (DOD) is now beginning to place a new constellation of satellites in space which will provide the most modern and sophisticated, navigation guidance ever devised: GLOBAL POSITIONING.

The Global Positioning System, or GPS, is a space-based satellite radionavigation system that will provide a continuous source of three-dimensional positioning, plus velocity and precise time. A fully operational satellite system is scheduled to be fully operational by 1992. Receiver sets will range from large, built-in equipment for transport aircraft to small, hand-held sets. In time GPS is expected to revolutionize electronic navigation and replace most current systems requiring land-based transmitters.

How It Operates

GPS will consist of a "constellation" of 24 satellites (including three operative "spares") placed in orbit in a predetermined configuration at an altitude of approximately 10,900 nautical miles above and around the earth. The position and orbiting path of each satellite will be known and controlled by a master station maintained by the Department of Defense at Colorado Springs, CO. The satellites will emit an L-band signal on 1,500 MHz, and their configuration will enable the signal from at least four of the satellites to be received at any point on earth at any time. A receiver must be able to compare signals from four satellites in order to function fully.

An activated receiver, carried by an aircraft or other vehicle—or even by an individual—will automatically select the optimum signal sources and analyze the data received. This will enable the receiver to establish and read out continuously the longitude and latitude as well as altitude, velocity and course, plus additional data useful for navigation or orientation.

The initial configuration of navigation satellites known as "NAVSTAR" was placed in orbit in 1978 by DOD for purposes of research and evaluation. The operational configuration of satellites will be placed into orbit by a series of Delta-II rockets (plus two space shuttle launches) over the next three years. Although originally developed by DOD for military purposes, the program has been funded by Congress in a manner that will also insure availability of a signal for wide range of civil use.

Advantages

- *Accuracy*. Position, within 100 meters; velocity, within one foot per second; time, within a fraction of a millionth of a second (about 95 to 98 percent of use).
- *Capacity*. Unlimited, worldwide.
- *Range*. Unlimited, worldwide.
- *Margin for human error*. Very small, since there is no user input required, as with inertial navigation.
- *Direct Routing*. With no land based transmitters, as with the current VOR system, there is no need to lose time and energy following a zigzag course. Thousands of waypoints could be retained in memory by a sophisticated receiver.
- *Automatic course indication*. Constant tracking over an electronic chart display will be offered on some receivers.
- *Terrain induced signal interference*. Virtually absent.
- *Continuous position reporting* world wide will be possible for aircraft equipped to transmit their position to ATC via communication satellites.
- *Wide Applicability*. Numerous civilian uses, in addition to aviation and marine navigation: land vehicle navigation; guidance for exploration on foot in remote or mountainous terrain; off shore oil exploration; aerial spraying; underground pipeline patrol, etc.

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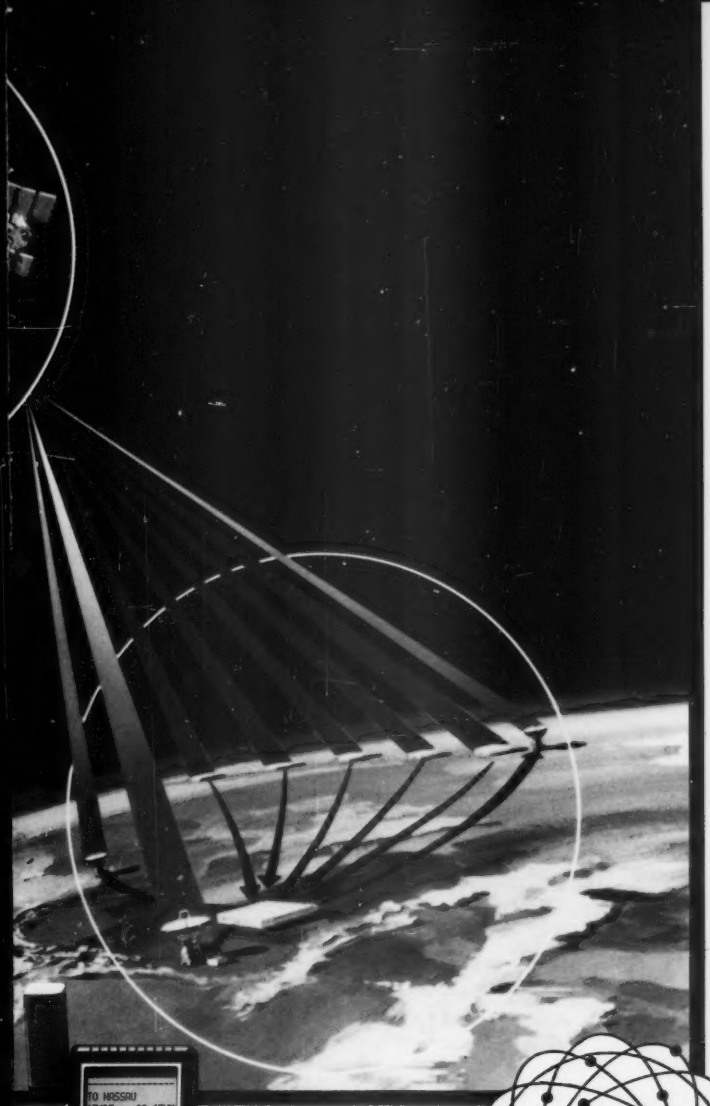
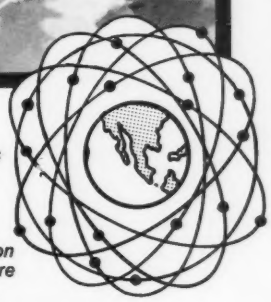




Schematic design shows satellite transmitters positions along carefully planned and monitored orbits to assure full time world wide coverage. Constellation will include three spare satellite transmitters.

Limitations

Neither DOD or FAA has plans for GPS use in precision approaches in aviation, such as those now carried out by means of ILS or MLS. Furthermore, until an acceptable means of alerting pilots that a system error has occurred, FAA will not authorize GPS as the primary system for en route IFR navigation nor as a nonprecision approach aid. (FAA currently requires that navigation system errors be conveyed to IFR pilots within 10 seconds of their occurrence for approaches.).

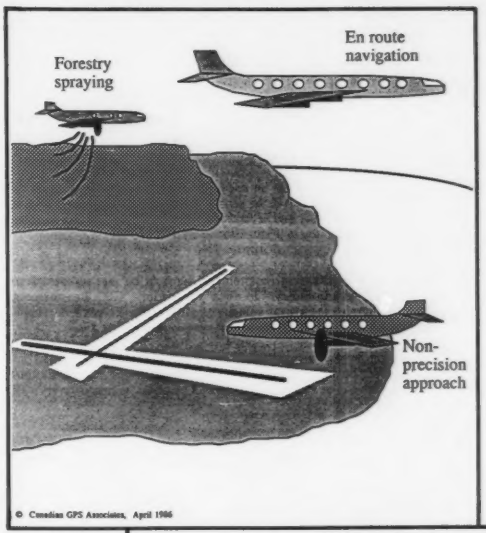
An appropriate means of determining tolerance outages and delivering such information to the pilot is now being developed. Until DOD officially declares GPS to be operational, even VFR usage of the system will be at the user's risk. As with all avionics equipment, the compatibility of any GPS receiver added to an aircraft electrical system will have to be assured by an appropriately rated mechanic.

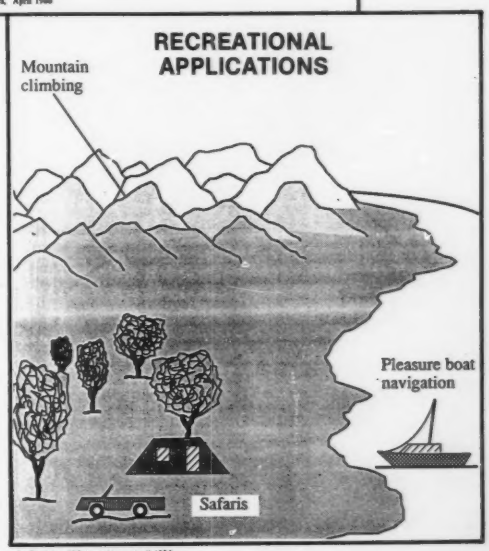
Receiver Availability

Limited production of military use receivers started in 1986, with some 2,000 sets expected to be produced by the end of 1989. After considerable evaluation, DOD will purchase over 25,000 sets between 1990 and the year 2000. Currently several dozen avionics corporations, both in the United States and abroad, are developing, manufacturing, and selling non-military GPS receivers, which can be used now with the current GPS test satellite constellation during certain portions of the day, as well as with the forthcoming operational group of satellites.

At present the cost of receivers is relatively high and few of the advertised receivers are readily available. However, once the 24-constellation GPS becomes fully operational and is integrated into civilian air traffic control systems and other civilian uses, a very competitive market for receivers is anticipated. The turn of the century should find us well into the age of space-based terrestrial navigation. ■

SOME OF THE MANY ANTICIPATED AIRBORNE APPLICATIONS



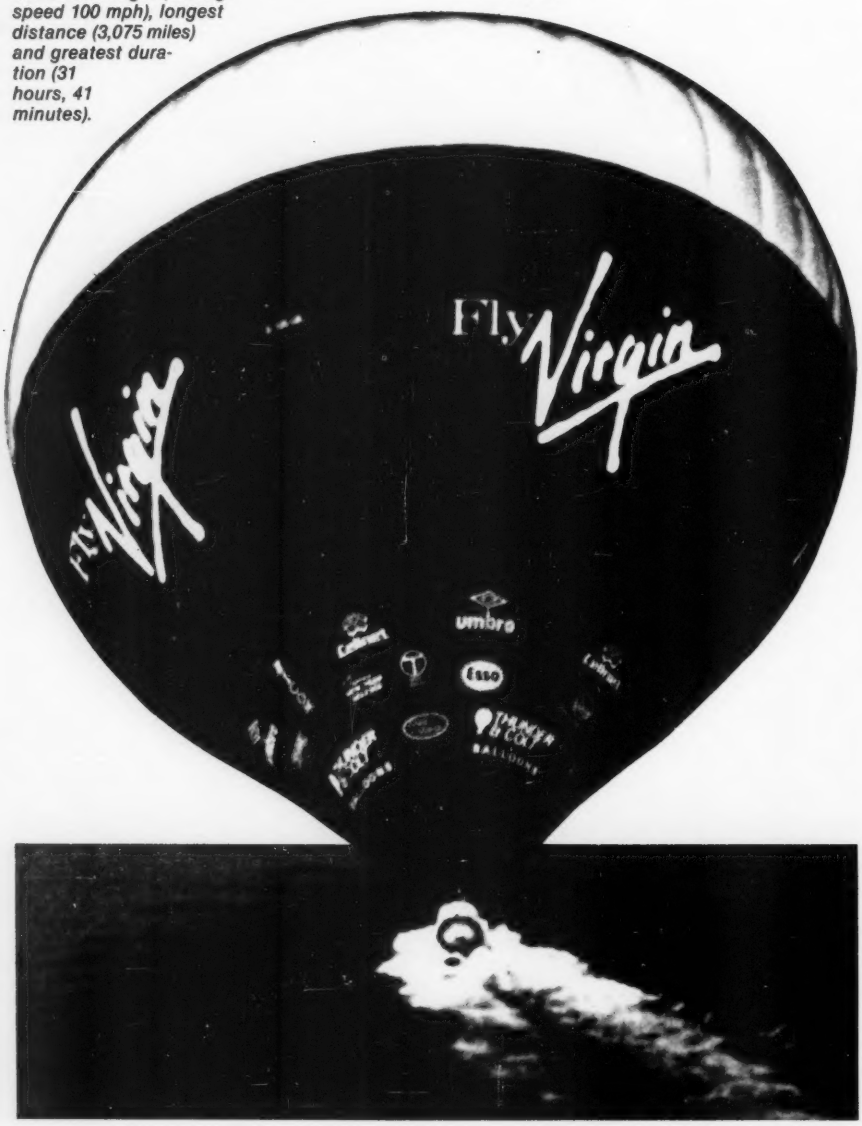


Per Lindstrand-designer, manufacturer and pilot of the ICI Films "Stratoquest" balloon. He was the first to pilot a hot-air balloon across the Atlantic, thereby setting world records for the fastest flight (average speed 100 mph), longest distance (3,075 miles) and greatest duration (31 hours, 41 minutes).

Per Lindstrand

The Audacious Aeronaut who has lifted hot air ballooning to new heights

In 1783 a French papermaking family named Montgolfier provided the hot air balloon which achieved the first free flight by man. Francois Pilatre de Rozier soared over Versailles in a wicker gondola supported by a dome-shaped "envelope" filled with heated air and smoke. Ballooning quickly caught the public fancy, and the "sport" was taken up by the entire civilized world.



However, balloon flying was always limited by the periodic need to replace the hot air needed for lift. When the Atlantic Ocean was finally crossed by the *Double Eagle II* in 1978, it was by means of helium gas, which is very expensive and not readily available. Balloonists' dreams of crossing the oceans or penetrating the stratosphere by means of heated air seemed to be impossible fantasies until a determined Swede named Per Lindstrand made these dreams a reality.

Born in Sweden, Per Lindstrand developed an early fascination for aviation. He become a glider pilot while still in his teens and eventually joined the Swedish Air Force, working on top-secret weapons guidance and high-altitude aircraft testing projects. While he was in the military he built his first balloon and taught himself how to fly it.

He moved to England in 1976 and two years later founded Thunder & Colt Balloons in Shropshire. His company now has four factories and is known for developing new technologies and pioneering new skills. With the high tech developments of the 1980's Lindstrand felt that the time was right for hot air balloons to tackle what were once thought to be impossible challenges. He had three particular theories he wanted to prove:

1) That a hot air balloon could fly across the Atlantic in the jet stream;

2) That it was possible to fly in a pressurized capsule underneath the balloon; and

3) That the lifting quality of the air could be almost entirely sustained by solar energy.

Obtaining financial backing for an Atlantic crossing was the first hurdle to overcome. In June 1986, Virgin Atlantic Airways became a major sponsor and gave the balloon its name, the *Virgin Atlantic Flyer*. Millionaire-adventurer Richard Branson, owner of the air carrier, arranged to go along as copilot.

The proposed balloon envelope required lightweight, yet tear-resistant, material. Lindstrand contacted ICI Films (producers of high tech film products) who devised a double-skinned laminate comprised of lightweight rip-stop nylon fabric coated with a special metallized polyester film.

The balloon's envelope was specially designed to absorb as well as retain solar heat. The lower half was a "sooty" black on the outside, but coated inside with shiny aluminum film. Its purpose was to

absorb and trap as much heat from the sun as possible. Above the balloon's equator the envelope was designed to retain instead of absorb heat by means of fabric coated with a metallized surface inside and out.

If the balloon became too hot, a parachute vent at the top of the envelope could be manually opened to let the heat out and decrease altitude. During the second half of the Atlantic crossing, this procedure was constantly in use to stabilize altitude—proof that the solar heating was working successfully.

The balloon material was capable of withstanding temperatures in excess of 200°C and as low as minus 71°C—about the temperature that carbon dioxide, or dry ice, freezes. The balloon envelope was one of the largest ever built, extending vertically to 172.68 feet when fully inflated, with a volume of 2.137 million cubic feet. Given the difficulties of controlling such a huge balloon on landing, its life-expectancy was just one flight. Plans called for the envelope to be released on touchdown and, to keep it from interfering with navigable airspace, exploded.

An 8′1″ tall aluminum closed capsule with a diameter of 7′11″ was built as a pressurized gondola. There were three viewports in the capsule, two in the sidewalls—one of which doubled as the entry way—and one in the ceiling to give access to the burners. Inside the capsule there were two stations, one for the pilot (Per) and the other fitted with radio and navigation equipment for copilot Branson. The only concessions to comfort were the custom-built flight "sleeper seats," which the two men occupied during the entire flight.

On July 2, 1987, the flight took off with a bang (literally) from Sugarloaf Mountain in Maine. Two of the ten liquid propane fuel cylinders detached themselves at lift off, threatening to reduce the flight range. As the solar heating capabilities of the balloon had never been tested, each drop of fuel could be a precious commodity before the flight ended. In order to reduce the amount of drag, Branson decided to cut off the sandbag hanging from the side of the capsule. At daylight, at an altitude of 9,000 feet, he climbed out and, hanging on to the fuel cylinders, he cut the line with his knife. It was only after he was safely inside the capsule that he realized the two fuel cylinders that had detached at takeoff were similar to the one he had just been perched on.

Fortunately the flight became somewhat placid after that. There was some excitement when the balloon got caught in the wake turbulence of a supersonic *Concord*. The balloon was at 27,000 feet; the *Concord* was at 55,000 feet, but there was very little atmospheric mass to absorb the turbulence created by the SST at that altitude. Some 30 hours of smooth "sailing" after takeoff, the coast of Ireland was sighted. Picking a likely spot near a farmhouse in Limavady, Northern Ireland, they attempted to land. It would have been successful if the explosive bolts had released the balloon envelope as planned, but they failed. Instead the balloon bounced and started skyward toward Scotland. Over the North Channel, Per Lindstrand was able to bail out into the water, but then the balloon suddenly shot upward and Richard Branson was unable to jump. He eventually rode the balloon down into the sea and a short time later a rescue team plucked him from the water near the balloon. He then directed rescuers to the location where Per had safely bailed out.

The official flight time was 31 hours and 41 minutes for the 3,075 mile trip. They had reached a maximum altitude of 27,000 feet—the longest and highest distance flight ever accomplished by a hot air balloon. Thanks to the jet stream they had achieved flight speeds over 100 knots and thanks to solar heat entrapment they arrived in Ireland with plenty of fuel to spare.

Per's next challenge was the existing high altitude record for hot air balloons, set at 55,134 feet by Englishman Julian Mott in 1980. Penetrating higher into the atmosphere posed several vital problems. To begin with, there was serious doubt as to whether the standard propane fuel would continue to burn or, if it flamed out, whether it could be re-ignited in the vicinity of 55,000 feet.

Also, there would be a need for a pressurized container that would be strong enough to protect the crew—since exposure to the extremely low pressure at this altitude would cause unconsciousness and death within a few seconds. Furthermore, the gross weight of the pressurized "cabin" would be severely limited by the need for the balloon to ascend to the stratosphere in roughly one hour, before *all fuel was exhausted*.

As finally designed, the standard gondola was replaced by a vertical capsule, approximately four feet in diameter and just tall enough to accommodate Per Lindstrand's six foot frame (he elected to fly alone this time).

Constructed of aluminum only two millimeters thick, the capsule was capable of withstanding a pressure differential in excess of 5 pounds per square inch. Lindstrand himself wore a partial pressure suit, which would be activated in the event of sudden capsule depressurization.

With only a small viewport in the entry hatch and a tiny clear dome overhead, the lack of visibility required the flight to be flown solely on instruments. The interior looked more like the cockpit of an airliner than the gondola of a balloon. The instruments and equipment included an altimeter and variometer (which registers climb and descent rates); gauges for cabin pressurization, oxygen supply fuel flow; gauges showing burner gas temperature and temperature at the envelope's crown; two VHF receivers; and an altitude encoding transponder.

Dawn take-off in Texas for Lindstrand.

A two-stage titanium and stainless steel burner system powered the flight. Developed over the past five years by Lindstrand and his team of engineers, the burners would use standard propane fuel for the ascent to the base of the stratosphere, about seven miles above the earth. At this point a switch would be made to a specially developed fuel for the climb into the stratosphere. According to Per, "At full burn it would generate a staggering four megawatts of power—enough to provide heat and light for a town of 8,000 people ..."

The balloon envelope was similar in design to the one used on the Atlantic flight, except that in this case the envelope was designed to be re-usable. Also, since gaining altitude was the purpose of this flight, all but the neck of the balloon fabric was coated with a gossamer-thin layer of aluminum to reduce lift (heat) loss by radiation. The balloon stood 12 stories tall with a capacity of 600,000 cubic feet—eight times bigger than a conventional hot air balloon.

In the predawn (5:44 a.m.) of June 6, the *Stratoquest* launched from a site 27 miles north of Laredo, TX. Lindstrand had been playing a waiting game with the weather, knowing that even the slightest breeze could damage the balloon's fragile fabric. Following the calm air launch, he discovered that two 100 kilo (220 lbs.) sand-

(continued on back cover)

Toward Better Instruction–

by Kevin Murphy

FAA is now examining most initial CFI applications inhouse, with new emphasis on attending thoroughly to checklists and procedures. As the author/instructor discovered, all the aircraft papers may be in place, but are they correct?

You might have noticed that the Federal Aviation Administration is getting very serious about proper training for pilots. It has pulled examining authority for first-time CFI (certificated flight instructor) applicants from the designated examiners, opting to give all those checkrides within the agency for better quality control of instructor standards. Any CFI applicant must now be examined by a Federal examiner, except under certain limited circumstances.

"The best way to make sure the CFI knows what he is supposed to know is to give the checkride ourselves," is the opinion of FAA operations inspector Jack Keesey of Baton Rouge Flight Standards District Office (FSDO). There has been a new emphasis on enforcement in the past year and it seems to me that FAA inspectors now have more stringent guidelines to follow, than in days past.

The Practical Test Standards, the official manual of pilot checkride behavior, have also been updated; for example the publication date of the Private Pilot/Airplane Practical Test Standards was September 1985.

The new standards underscore the importance of checklists. The official word now says: "Use of checklist will be emphasized by the examiner."

I think that both of these changes are good. Not that the designated examiner system has turned out a horde of bad flight instructors, or that there has been wholesale disregard of checklists, but there are a few areas of instruction where quality has slipped a little in the past few years. I saw an example just last weekend.

My friend the new CFI had asked for an evaluation of his first student. "Just a short flight, maybe a few questions, to see if I've accidentally missed anything," he asked. "This guy's ready for his checkride."

The pilot-to-be had stored academic knowledge in all the right spots. His head pump was primed; facts about TCAs, TRSAs and ARSAs were available at the drop of a question. Sectional charts were no mystery, and a short practice session on ATC communications proved he had all but memorized the pilot-controller glossary found in the Airman's Information Manual. "Yeah, and I'm hell on wings in that airplane, too!" he said.

He had been taught the requirements and procedures carefully, just as his instructor and his instructor before him, but practical application was another matter. "You ever do a weight-and-balance on this airplane?" I asked.

"Yessir! We covered that real well in ground school, and I don't think I have any problems with that at all." He pulled out the owner's manual for the airplane and started figuring furiously with the stubby end of a pencil. Sure enough, we were legal—or were we?

"How much does this empty airplane weigh?" I asked.

"Umm." He fumbled through the owner's manual again until he found the page with the sample weight-and-balance he had used for his computations, pointed to it, then pulled his fingers back.

"Wait," he said. "This is only the sample weight, isn't it? Where do I find the real weight?"

We scoured pocket panels in every corner of the airplane, looking for equipment lists or logbooks. We found the equipment list, something the pilot had never before seen on a real airplane, and looked down the list of "superceded" weight-and-balance information. The last item, dated April 1980, showed what presumably was the current weight and moment figures for the airplane, and he brightened.

"Aha!" he said. "I'd never actually looked for these before," and he started refiguring the problem with the allegedly correct information.

UP-TO-DATE WEIGHT

But the information wasn't correct. Aside from the relative antiquity of the latest entry—eight years before—there were some changes on the panel that looked suspicious. A shiny new intercom system and a new King navcom set that probably hadn't even been manufactured in 1980 adorned the center panel, and a gaping hole announced the recent departure of some other piece of electronic gear. The pilot, puzzled, started comparing the equipment listed on the sheet with what was actually installed and scratched his head. "I can't do an accurate weight-and-balance, can I?" he asked.

We moved on. "What other paperwork is required to be in the airplane?"

He trolled his mind, fishing for that section of ground school, and came up with the correct answer. "Arrow," he said. "Airworthiness, registration, radio, operating limitations and weight-and-balance information."

All the pieces of paper were there. "But look," he said, examining the registration certificate, "the name of this isn't the same as the name of the flight school." It wasn't; the airplane was still registered to a company that had gone out of business more than two years before.

"Where do I find the O in Arrow?" he asked, and I pointed out the placards and markings on the instruments for operational limitations. "My instructor told me about those, but I guess I'd never really looked for myself," he said.

The rest of the preflight was done in an FAA-approved manner, with the owner's manual checklist in hand. The only deviation noted was the oil-access door on the cowling.

"It keeps coming open and flopping up and down in flight," he said. "Does it all the time. Sure did give me a start the first time, just when I was at the top of a power-on stall."

The pilot's seat adjustment wasn't quite right, either. Evidently, the seat was stuck too far back or his legs were too short. His energetic efforts to get the seat to move forward looked like a man try-

ing to get out of the electric chair just before the warden sizzles the juice down the line. Finally, he gave up, tapped the rudders with his toes and said, "Well, I guess I can reach them if I scrunch down far enough."

I tried to lighten the situation a little bit with a joke, offering to act as his safety pilot while he flew with the row of circuit breakers at his eye level. He was not amused.

ARE YOU AIRWORTHY?

"Is this airplane airworthy?" I asked, hoping he would reply, "No," but he didn't. He said, "I don't see anything that would really make it unflyable," and we taxied out.

He'd been well taught, mostly. Ailerons and elevator were held correctly for the gusty winds that day; he taxied slowly and tapped the brakes just after starting to ensure braking action. His radio technique was flawless.

In the runup area, he followed the checklist carefully, item by item. One mag was a little rough, so he leaned the mixture to make the engine run hot enough to clean carbon off the plugs and then rechecked the mag—perfect.

"You missed the carburetor head check," I pointed out, but he shook his head.

"Doesn't matter. The carb heat knob won't pull out anyway. You ready for me to go demonstrate my greatness in the air?"

"Has this carburetor heat knob been broken before?"

"Last few times, yes, so I just skipped it on the checklist."

"Your instructor approved of this?" I asked.

"Well, he said it really ought to be working, but the only other choice, was not to fly, so we flew with it broken." He shifted nervously in his seat, eyeing the Hobbs meter ticking away. "Well, are you ready to fly?" He had the microphone in hand to call for a takeoff clearance.

"No, I'm not going to fly in this airplane. Taxi us back."

In the office, the young flight instructor who doubles as receptionist and keeper of rental airplane keys tried to talk the pilot into taking the airplane anyway. I sat back and listened in amazement.

"Look at what a nice day this is," he was arguing, "I mean, really, what are your chances of getting carburetor ice on a nice day like today? Huh? Why don't you just fly the airplane like this, and I'll try to get the mechanic to fix it next week, okay?"

Hardly, the old registration certificate made the airplane technically illegal to fly and probably would have kept airworthiness directives on this airplane from reaching the flight school. The weight-and-balance information made the airplane both legally and practically unairworthy, since the pilot would have no way of knowing whether he was within weight and center of gravity (CG) for that flight.

The oil access door, flopping around (and it did, on the taxi trip back in) would be a distracting annoyance. The seat "adjustment," which meant that the pilot was unable to get the seat out of the rear-most position and must submarine himself to reach the pedals, was definitely a no-go item, whether the seat itself was broken or the pilot simply was unable to make it move. After all, the checklist says "adjust seat," not "adjust pilot."

NECESSARY HEAT

The coup de grace, the nonfunctional carburetor heat on an airplane that has carb heat because it needs carb heat, should have cinched the decision. I asked the pilot, "And you've been flying an airplane like this?"

The instructor had permitted it, probably because his instructor had permitted it, or something like it. The young fellow at the rental counter urged the pilot to ignore the "minor" problems and take the airplane anyway, and what does a student pilot know when a CFI tells him to "go ahead and take it?"

Is this nit-picking? I don't think so. The FAA, for all its bureaucratic ways, made the right decision in taking back the authority to issue original CFI tickets. Without condemning the fine work and dedication of most designated examiners, I must point out that FAA inspectors don't feel the subtle but ever-present economic pressure exerted by market forces on private sector designated examiners and currently will no doubt look a lot more critically at the skills of prospective instructors and the teaching standards demanded of those instructors. Practical applications of the Federal Aviation regulations—as in checking to see if an airplane really is airworthy—will no doubt receive closer scrutiny. Also, the new-found emphasis on checklists will, I hope, emphasize intelligent use rather than simply substituting the checklist for brains.

Out of curiosity, I called the local FAA office the next day to ask what constitutes airworthiness. According to the maintenance inspector, there are four conditions required for airworthiness, and this airplane lacked three of them. The four conditions are:

1. Conformance with the type certificate under which the airplane was manufactured. The inaccurate weight-and-balance information and carburetor-heat deficiency, with the obvious potential for contributing to an accident, meant that this airplane was illegal.
2. Modification must be done with approved data, so the unrecorded radio installations should have grounded the airplane.
3. Airworthiness directives must have been complied with.
4. The aircraft must be in condition for safe flight. The inaccurate weight-and-balance, the carburetor-heat deficiency and even the oil-door problem failed to fit into this condition, the inspector said.

The inspector emphasized that, in many cases, the FAA has tried to avoid issuing violations if the matter can be resolved by counseling the pilot or the operator of the airplane. "We'd rather have compliance," he said, "It doesn't make my day to write a violation."

A condition notice of airworthiness deficiencies would likely be hung on the airplane, to be signed off by the mechanic making the repairs, and the matter would then be closed.

But if flagrant illegal operations or a truculent pilot make it necessary, a violation—known as an enforcement investigative report, or EIR—is started. The results of the field investigation, with voluminous paperwork, are forwarded to the FAA regional office for processing. If the regional office agrees that enforcement is necessary, the FAA attorneys take over.

Violations normally take one of two forms. The most common is a civil penalty, a fine levied against the pilot and/or the operator. The maximum penalty, for general aviation, rarely invoked, is $1,000 per illegal flight. The less-common action has the FAA seeking to suspend or revoke a pilot's or mechanic's certificate.

Of course, all this talk about FAA enforcement actions is really unnecessary; flying an unairworthy airplane long enough will usually bring in another Federal investigative agency; the National Transportation Safety Board, which is responsible for determining accident causes. ■

This article, which first appeared in AERO magazine, is the property of the author and may not be reproduced without his permission. *Mr. Murphy is a CFII with 17 years experience, a freelance writer, and the Director of Training and Education for the Louisiana Department of Transportation.*

An Action Notice issued by FAA's Director of Flight Standards on July 1, 1988, advised field offices that as a result of FAA's resumption of responsibility for all practical tests for the original issuance of flight instructor certificates, some delays were being experienced by applicants for the flight instructor practical tests.

To alleviate the situation, individual Flight Standards District Offices (FSDO's) will be authorized to designate selected flight instructor examiners (FIE's) to conduct this type of practical test in accordance with demonstrated need for reducing a test backlog.

Questions regarding this policy may be directed to FAA's General Aviation and Commercial Division, AFS–800, Washington, D.C. 20591 (telephone 202-267-8212).

CLOUD SEEDERS may be back. A repetition of last summer's long hot drought may see a renewal of interest in squeezing rain out of the sky. In previous experiments, silver iodid or other tiny particles were added by airplane to the updraft of a storm center, in an attempt to increase the formation of water droplets and to prevent the crystallization of large destructive hailstorms.

PROCEDURES FOR AIRCRAFT WITH INOPERATIVE EQUIPMENT

Under recent amendments to Part 43 and 91 of the Federal Aviation regulations, many general aviation aircraft may be flown when certain instruments or equipment are inoperative, under specified conditions.

The new amendments affect rotorcraft, nonturbine-powered airplanes, gliders or lighter-than-air aircraft for which a Master Minimum Equipment List has not been developed; and also small rotorcraft, nonturbine-powered small airplanes, gliders and lighter-than-air aircraft for which a Master Minimum Equipment List has been developed.

The inoperative instruments or equipment must not be:

(1) VFR day type instruments or equipment prescribed in the airworthiness certification regulation under which the aircraft was type certificated (FAR §91.30 (d)(2)(i).

(2) Instruments or equipment required by the Aircraft's Equipment Lists, or by the "Kinds of Operation" Equipment List. (FAR §91.30 (d)(2)(ii).

(3) Instruments or equipment required by FAR §91.33, §91.24, §91.52, etc; also §91.30 (d)(2)(iii).

(4) Instruments or equipment required by an airworthiness directive.

Additional actions required before an affected aircraft may be flown with inoperative instruments or equipment:

(a) Inoperative instruments or equipment must be removed from the aircraft, and placarded "inoperative."

(b) The inoperative instruments or equipment must be deactivated and placarded "inoperative."

(c) The pilot must make a determination that loss of the inoperative instruments or equipment does not constitute a hazard to flying the aircraft.

(d) At the next scheduled and each succeeding inspection, inoperative instruments or equipment must be repaired, replaced, removed, or inspected.

(e) When aircraft are returned to service with inoperative instruments and equipment, the maintenance facility will ensure that the instruments and equipment have been placarded "Inoperative."

FAA is currently preparing an advisory circular which will discuss these actions in further detail. The circular should be available at FAA field offices by early summer. Meanwhile, for additional information contact Lee Brooks, AFS-820, FAA, Washington, D.C. 20591; telephone (202) 267-8194.

MIDAIR ACCIDENTS DOWN

The year 1988 saw a healthy decrease in the number of midair and near-midair collisions recorded in civil aviation. The 16 midairs last year were 36 percent below the 25 reported in 1987, and the second lowest number since 1964.

Similarly, the 706 near-midair collisions in 1988 were 33 percent below the 1987 total (1,058). The 1988 figure represents the first downturn in near-midairs since FAA upgraded its reporting system in 1985 to ensure a more complete data collection on these accidents.

WINDSHEAR TRAINING AID AVAILABLE ON VIDEO TAPE

In an effort to improve the training of pilots to recognize, avoid, and cope with inadvertent windshear encounters, the FAA has compiled a two volume Windshear Training Aid. This guide is composed of the "Windshear Overview for Management," "Windshear Substantiating Data," "Example Windshear Training Program," and two videos. Another part of this package is Advisory Circular 00–54, "Pilot Windshear Guide."

The publication's purpose is to summarize and communicate key windshear information to pilots during training and to be used afterwards as a handy reference. To keep the information up to date, a meeting will be hosted by FAA approximately every 18 months to incorporate new information in the Guide.

The Advisory Circular is available free from DOT, M–443.2, Washington, DC 20590. The other publications may be purchased from the National Technical Information Service, 8285 Port Royal Road, Springfield, VA 22161 (telephone: 703-487-4650), or as a multi-media package may be ordered from the National Audiovisual Center, 8700 Edgeworth Drive, Capitol Heights, MD 20743-3701 (telephone: 301-763-1896).

NEW PUBLICATIONS:

TSO's, 'CHUTES, NAV SYSTEMS

The latest issue of "Index of Aviation Technical Standard Orders" (AC 20–110E) details how Technical Standard Orders (TSO's) for civilian aircraft aeronautical products are developed and issued. The advisory circular, which contains an index of FAA TSO's, is available free from DOT, M–443.2, Washington, DC 20590.

The "Parachute Rigger Senior/Master Certification Guide" (AC 65–5B), has been updated. Information on how to apply for the parachute rigger certificate and ratings, and on how to prepare for the written, oral, and practical tests is provided in this advisory circular. It is available from the Superintendent of Documents, U.S. GPO, Washington, DC 20402 at a cost of $1.75 (stock number SN 50–007–087–4).

Two advisory circulars have been issued on obtaining an airworthiness approval of navigation systems for use under VFR and IFR. They are "Airworthiness Approval of Vertical Navigation (VNAV) Systems for Use in the U.S. National Airspace System (NAS) and Alaska" (AC 20–19), and "Airworthiness Approval of Multi-Sensor Navigation Systems for Use in the U.S. National Airspace System (NAS) and Alaska" (AC 20–130). Both are free from DOT, M-443.2, Washington, DC 20590.

• Level at DH?

The following is a question that is discussed at length in the CFI Refresher Clinics that we conduct:

"Will a pilot on an ILS approach, if the approach is stabilized and being properly flown on the glide slope, descend below decision height while making the decision?"

We ask this question because we still see instructors as well as examiners who teach their student to level off prior to decision height rather than risk descending below it while making the decision.

It is our position that the aircraft will always descend below decision height while the pilot is making the decision if the approach is being properly flown. This does not mean that the pilot may continue the approach if the runway environment is not seen.

Gregory G. Gorak
Milwaukee, WI

During a precision approach, the aircraft will maintain the glide angle indicated by the glide slope receiver until the Descent Height altitude is reached. At that point, if the pilot has the runway environment in sight and the aircraft configuration is appropriate for landing, the descent may be continued without interruption. Otherwise, a missed approach must be initiated immediately, and ATC should be notified.

It is expected that during a missed approach the aircraft will necessarily descend somewhat below the DH because of the downward inertia of the aircraft. However, a safety factor to accommodate the anticipated flight path is built into the course.

• CFI Eligibility

I hold a commercial pilot's certificate, but my medical has been downgraded from second class to third class. Can I still apply for a CFI?

Name withheld

Affirmative.

• Negative Impact

I assume that as FAA Aviation News, is a safety publication, the Sept/Oct 1988 cover picture was chosen as a warning that people who use ladders to work on the aircraft do not use their ladder as shown.

Hopefully your readers will be reminded about the perils of leaning to one side of the ladder to install or check a component; standing on one foot instead of moving the ladder to a safer position; or wearing a large key ring attached to the belt loop of the pants. We certainly were.

Michael J. Papoi
Traverse City, MI

• Homebuilt Sensitivity

It was gratifying to see the article on "Flight Testing Homebuilts" (Nov/Dec 1987). However, during my reading of the article, a double take was made upon seeing a statement that got by the publication review process. Short wing spans often result in greater roll sensitivity than the homebuilder may have experienced in flying commercial aircraft, particularly trainer types. In fact, many homebuilts are more sensitive about all axes than most commercial aircraft and pitch sensitivity is certainly one of them. Again, it was a great pleasure to see the article, but I did want to correct the referenced statement.

George Lutz
Springfield, VA

• T & G Landings

In the instruction article by Al Milana in the Sept/Oct 1988 FAA AVIATION NEWS, I couldn't disagree more on not having student pilots doing touch and go's before solo because of the workload. When an instructor signs off a student to fly solo for 90 days, that instructor should be signing off a student fully competent to fly within student pilot limitations.

That doesn't mean signing off someone who can barely fly, it should mean someone who has as much reasonable chance of bringing the airplane back in one piece as most active pilots. Most active pilots probably did their highest percentage of best landings as student pilots. On the student's last pre-solo flight, the instructor should be no more than a passenger.

Roger K. Fike
Paso Robles, CA

Mr. Milana does not wish to exclude touch and go landings from student instruction (this maneuver is recommended in the FAA Aviation Instructor's Handbook). He simply questioned the wisdom of introducing it to the student early in his training, prior to his first solo endorsement.

A student who has received a 90-day endorsement for repeated solo flight will be more experienced and able to handle T&G landings.

• Restructured Logbook

A close friend of mine lost his logbook during a trip to Wyoming last July, among other things it contained a recent BFR. How does a pilot go about restructuring a lost log?

William M. Reigle
Spring Grove, VA

To begin with, you should write to the Airman Certification Branch, (AAC–260, FAA Aeronautical Center, P.O. Box 25082, Oklahoma City, OK 73125) and ask for a written copy of your last airmen certificate and/or rating application. This will provide you with a record of the information on that document including flight time and type of flight activity.

To establish logged accomplishments which are not filed with the Certification Branch, such as a Biennial Flight Review, you may ask the instructor involved for a re-endorsement, based on his records. Otherwise you will have to take another BFR.

Flight time which required no endorsement or FAA certification may be re-established from memory if necessary, although you should endeavor to support the data with fueling receipts and other written and dated records associated with your flying. All such records should be kept in your files as an adjunct to your new logbook.

FAA AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA AVIATION NEWS, AFS-20, Washington, DC 20591.

• T and G in SVFR

In reference to the Sept/Oct 1988 FORUM, I agree with your response to the letter from Mr. Wheeler ("SVFR clearances"). But I believe that you have not made it fully clear that his assumption that Special VFR operations are not limited to aircraft exiting or entering a control zone.

I would also appreciate knowing the source of your policy statement.

Corey J. Ferguson
Mission Viejo, CA

All questions on matters concerning control zone operations should be addressed directly to FAA, Air Traffic Rules Branch. ATO–230, 800 Independence Ave., SW, Washington, DC 20591.

INSTRUMENT CORNER

• ILS Distortions

During instrument landing training we have had several instances of localizer and/or glide slope signal distortion, as a result of pilots disregarding the critical airport areas when the ceiling was above 800 feet and the visibility two miles or better. This could have had tragic consequences.

Since there is an increasing need to practice auto-land operations in good weather, I would like to see a graphic depiction of these critical areas in the Airman Information Manual. There seems to be some ignorance on the subject among both pilots and controllers.

George Waddington
Spring Hill, TN

The agency is planning to include a graphical depiction of ILS critical areas in future editions of AIM.

However, your problem does not appear to be pilot ignorance or non-compliance. There is no requirement for pilots to hold short of the areas where aircraft might interfere with the ILS as long as the ceiling is above 800 feet and the visibility two miles or better.

To prevent distortion of the localizer and glide scope signals during practice ILS approaches you are advised to contact the tower well in advance of your actual approach and ask their assistance in seeking pilot cooperation as regards to holding short of the ILS critical areas.

Bear in mind that vehicular traffic not subject to ATC may cause momentary deviation to localizer or glide slope signals. Also, critical areas are not protected at uncontrolled airports.

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Famous Flyers

(continued from p. 11)

bags had been inadvertently left tied to the gondola. In view of a similar oversight at the launch of the "Flyer," Lindstrand no doubt had a feeling of *deja vu*. The extra weight was causing an excessive consumption of burner fuel.

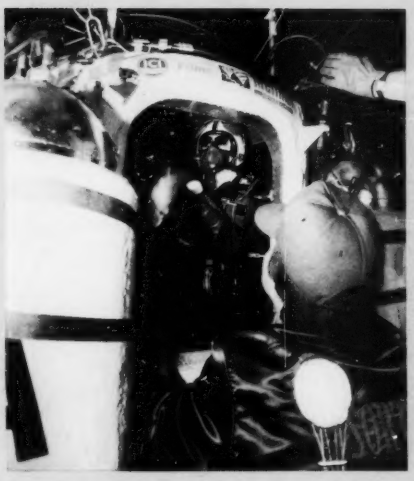
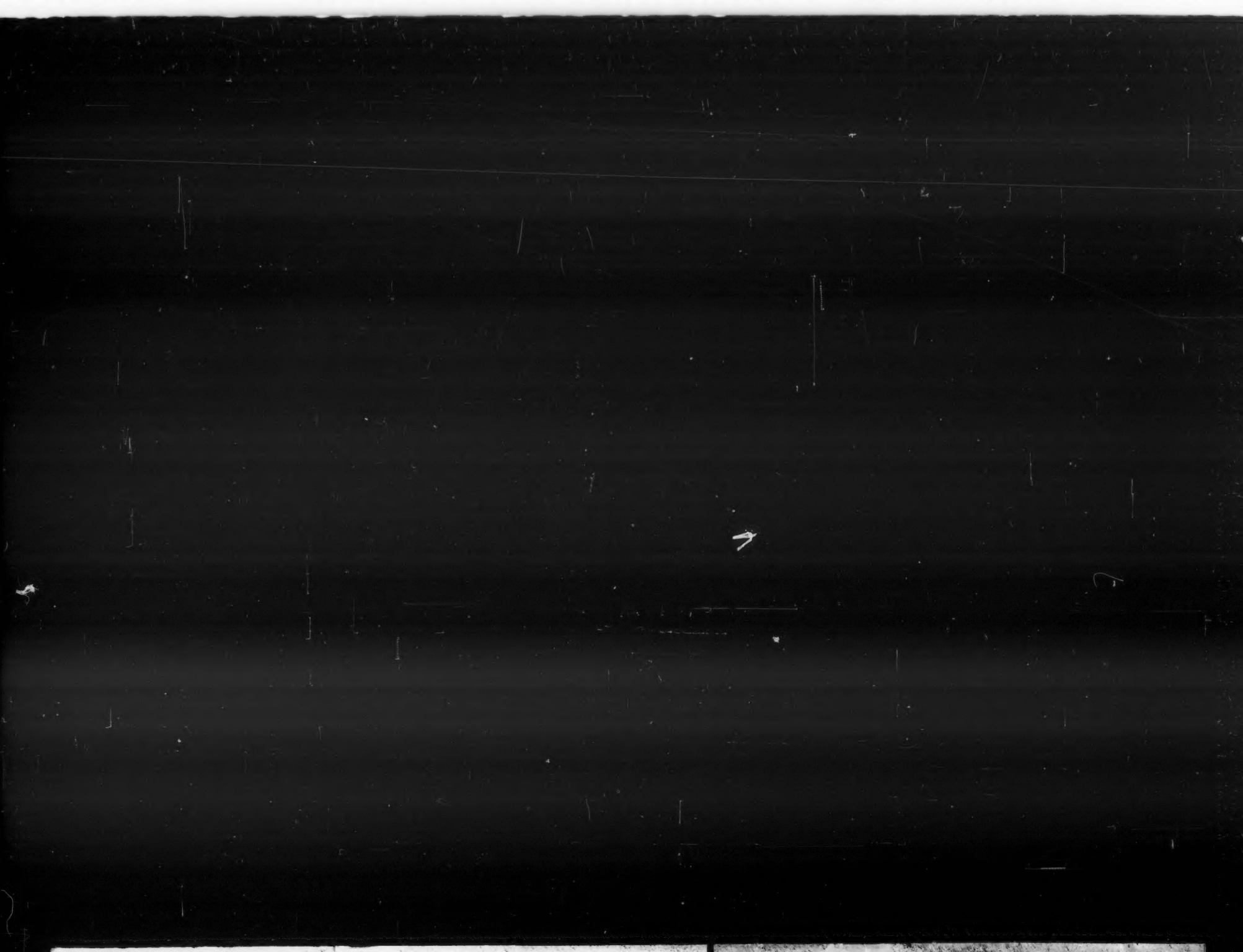
The balloon was at 21,000 feet when he emerged from his capsule far enough to cut loose one bag. However, he found his oxygen line was not long enough for him to reach the last bag. So, taking a deep breath he let go of his oxygen line and hoped for the best as he reached for the tethered bag's cord and sawed away with his knife. "It seemed like three hours but it was probably no more than 10 seconds," he said later. As it was, the extra weight cut an estimated 5,000 feet from the altitude the balloon might have achieved. At 7:11 a.m. the *Stratoquest* stabilized with the altimeter reading 59,700 feet.

The descent took an hour longer than expected, because the balloon's heat retention system worked better than expected. At 42,000 feet the balloon refused to go lower without repeated venting, which eventually produced a descent rate of 500 feet per minute. At 12,000 feet he relit the burners to slow the descent, and at 9:18 a.m. he landed safely in a hayfield near Freer, TX, 60 miles from the launch site.

The victory was sweeter than expected. Aboard the capsule was a sealed barograph which recorded the official altitude for the International Aeronautical Federation in Paris. The final figure was an astonishing 65,000 feet.

Lindstrand summed up the challenge by saying, " ... this flight, to a balloonist, was what a sound barrier was to a jet pilot in the 1940's. It was an explorer's barrier. What we did was [break] a barrier in every sense of the word." Hopefully, further exploration of the upper atmosphere by balloons will add to the rich store of high tech innovation yielded by space flight.

What are Lindstrand's plans for the future—a climb to greater heights? a nonstop flight around the world?—he is not sure. But after all, the *Stratoquest* is reusable. ■



Pressure-suited Per Lindstrand is crammed into pressurized gondola for his successful assault on the world altitude record for hot air balloons, set on June 6, 1988 at Laredo, TX. This STRATOQUEST flight followed his earlier conquest of the Atlantic Ocean.